## REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-3 and 8-9 are presently active in this case. None of the claims are amended.

The outstanding Office Action rejected Claims 1-3 and 8-9 under 35 U.S.C. §103 as unpatentable over Hosaka et al. (Japanese Publication from Applied Physics Vol. 35, 1996, pp. 443-447, herein "Hosaka").

In response to the rejection of Claims 1-3 and 8-9 under 35 U.S.C. §103(a), Applicants respectfully request reconsideration of this rejection and traverses the rejection, as discussed next.

Briefly recapitulating, Claim 1 relates to an optical recording medium having a phase change recording layer including antimony (Sb) and indium (In) as a main component, in which recorded marks having a shortest length of up to 350 nm are formed, wherein said recording layer ***does not include silver (Ag)***.

As explained in Applicants' Specification at page 4, lines 13 to 24, Applicants' invention improves upon background optical recording media, since it can provide a phase change optical recording medium capable of forming microscopic recorded marks which are stabilized in shape and size with improved thermal stability.

Turning now to the applied reference, Hosaka describes a nanometer-sized phase-change recording method using a recording layer of 30nm thickness.[1] Hosaka teaches that a typical thin film made of Ge, Sb and Te (Germanium, Antimony, and Tellurium) is used.[2] However, Hosaka fails to teach or suggest that the recording layer does not include silver (Ag). The outstanding Office Action asserts that Hosaka teaches such a feature and points out to Hosaka from page 443 to page 444, section 2.2 to section 3.1. Applicants respectfully

[1] See Hosaka in the Abstract.
[2] See Hosaka at page 444, paragraph 2.2, lines 1-15.

submit that Hosaka fails to explicitly teach or suggest that the recording layer does ***not include*** silver (Ag). Hosaka merely explains that a $Ge_2Sb_2Te_5$ film is used and that "PC recording was done using a ***typical*** PC [phase change] film of GeSbTe."[3] In the field of optical recording layers, one of ordinary skill in the art knows that a typical phase change film including $Ge_2Sb_2Te_5$ ***does not solely include*** the three elements Ge, Sb and Te, but that these elements are present with the ratio 2:2:5, without excluding other elements. In other words, a thin film made of $Ge_2Sb_2Te_5$ usually contains other elements, as shown in Morimoto, et al. (U.S. Patent No. 4,670,345). Morimoto et al. is directed to an information recording medium using SbTeGe thin films, and Morimoto et al. explains that "[t]he recording layer composed of Sb, Te and Ge of the recording medium according to the present invention may further contain other metals, as needed," and further recites "the incorporation of an element, such as Au, Ag, Cu or the like, which is highly bonded metallicaly is effective for accelerating the rate of change in optical characteristics of the recording medium."[4] Another document that support Applicants' position that the above feature regarding the recording layer not including silver (Ag), as recited in independent Claim 1, and that such a feature is not obvious, is provided with the article "Electrical Properties of Ag-Doped $Ge_2Sb_2Te_5$ Films Used for Phase Change Random Access Memory" of Xia Ji-Lin et al., published in 2005 by Chinese Physics letter 22, pages 934-937. A copy of Morimoto et at. and the Abstract of Xia Ji-Lin et al. is herewith submitted to the Examiner for consideration.

The fact that the reference Hosaka fails to literally describe that the recording layer does not including silver, does not automatically mean that in Hosaka's phase change recording layer there is no silver (Ag), since Hosaka clearly mentions the use of a "typical PC layer," as shown in the Morimoto et al. reference. In addition, it is believed that such feature is not inherent from the teachings of Hosaka, since the exclusion of silver from the phase

[3] See Hosaka at page 443, paragraph 2.1, lines 5-6, and in corresponding Figure 1(a).
[4] See Morimoto, et al. at column 5, lines 48-58.

change layer in light of the description provided by Hosaka ***is not necessary***. In this regard, see *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Applicants therefore believe that it is not shown that a missing descriptive matter in the reference Hosaka is necessarily present. See *Acromed Corp. v. Sofamor Danek Group, Inc.*, 253 F.3d 955, 58 USPQ2d 1865 (Fed. Cir. 2001).

Consequently, in view of the present request for reconsideration, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-3 and 8-9 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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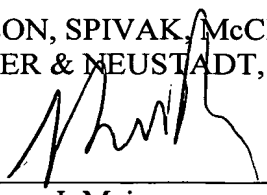

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# Electrical Properties of Ag-Doped $Ge_2Sb_2Te_5$ Films Used for Phase Change Random Access Memory

Xia Ji-Lin *et al* 2005 *Chinese Phys. Lett.* **22** 934-937 doi:10.1088/0256-307X/22/4/043

Full text PDF (225 KB) | References | Articles citing this article

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**Abstract.** Ag-doped $Ge_2Sb_2Te_5$ films were deposited by rf magnetron sputtering on $SiO_2$/Si substrates. The content of Ag ranging from 4.5 to 11.3 at.% is determined by inductively coupled plasma atomic emission spectrometry. The crystallization temperature of Ag-doped $Ge_2Sb_2Te_5$ increases with the increasing Ag content and the stability of phase change film is improved greatly. Structures were measured by x-ray diffraction and the face-centered-cubic structure was more stable after Ag doping. Four-point probe was used to measure the sheet resistance of Ag-doped $Ge_2Sb_2Te_5$ films annealed at different temperatures and it is indicated that Ag atoms increase the sheet resistance of $Ge_2Sb_2Te_5$ thin film when the annealing temperature is higher than about 360 degrees C, which is beneficial for reducing the reset current. Current-voltage curves were tested and it is demonstrated that 4.5 at.% Ag doping into the $Ge_2Sb_2Te_5$ film can reduce the threshold current from 1.46 mA to 0.25 mA and can only increase the threshold voltage slightly, which is very useful for low energy consumption.

PACS numbers: 73.61.Jc, 61.72.Ww, 61.66.Dk, 84.37.+q

Print publication: Issue 4 (April 2005)
Received 4 November 2004

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